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Substitute
Specification

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Charge sensing devices and a matrix-addressable memory device provided therewith

The present invention concerns a charge sensing device comprising charge reference means and sense amplifier system, particularly for sensing the charge of a passive addressable charge-storing means. The present invention also concerns a charge sensing device for sensing the charges of a plurality of passive addressable charge storing means.

The present invention finally concerns a non-volatile passive matrix-addressable memory device comprising an electrically polarizable dielectric memory material exhibiting hysteresis, particularly a ferroelectric or electret material, wherein said memory material is provided in a layer contacting a first set and second set of respective parallel addressing electrodes, wherein the electrodes of the first set constitute word lines of the memory device and are provided in substantially orthogonal relationship to the electrodes of the second set, the latter constituting bit lines of the memory device, wherein memory cells with a capacitor-like structure are defined in the memory material at the crossings between word lines and bit lines, wherein each memory cell can be selectively addressed for a write/read operation via a word line and bit line, wherein a write operation to a memory cell takes place by establishing a desired polarization state in the cell by means of a voltage being applied to the cell via the respective word line and bit line defining the cell, wherein said applied voltage either establishes a determined polarization state in the memory cell or is able to switch between the polarization states thereof, wherein a read operation takes place by applying a voltage to the memory cell and detecting at least one electrical parameter of an output current on the bit lines, and wherein one or more charge sensing devices according to the invention are provided for sensing said polarization states of said memory cells during a read operation.

Ferroelectrics which property constitutes a subclass of electrodes are electrically polarizable materials that possess at least two equilibrium orientations of the spontaneous polarization vector in the absence of an external electrical field, and in which the spontaneous polarization vector may be switched between those orientations by an electric field. The memory effect exhibited by materials with such bistable states of remanent polarization can